A.D. 1870, 21st FEBRUARY. N° 506.

# SPECIFICATION

OF

## JOHN LEOPARD.

## TREATING AND FILTERING SEWAGE.

LONDON:
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# A.D. 1870, 21*st* FEBRUARY. N° 506.

## Treating and Filtering Sewage.

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**LETTERS PATENT** to John Leopard, of Hassocks Station, Hurstpierpoint, in the County of Sussex, for the Invention of "IMPROVEMENTS IN TREATING AND FILTERING SEWAGE, AND IN APPARATUS TO BE EMPLOYED FOR THESE PURPOSES."

Sealed the 19th August 1870, and dated the 21st February 1870.

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**PROVISIONAL SPECIFICATION** left by the said John Leopard at the Office of the Commissioners of Patents, with his Petition, on the 21st February 1870.

I, JOHN LEOPARD, of Hassocks Station, Hurstpierpoint, in the County of Sussex, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN TREATING AND FILTERING SEWAGE, AND IN APPARATUS TO BE EMPLOYED FOR THESE PURPOSES," to be as follows :—

This Invention has for its object improvements in treating and filtering sewage, and in apparatus to be employed for these purposes.

For the purpose of filtering sewage I cause it to flow down a zig-zag channel having a slight fall or inclination ; across the channel at intervals are placed frames containing straw, or it might be rushes or broom, sea-weed, or such like substances. As the sewage flows through these filters

the solid matter contained in it is arrested by the straw or like material, whilst the clear liquid flows away from the bottom of the zig-zag channel into an outlet sewer or passage. This outlet sewer or passage I form to be a continuation of the inlet sewer which delivers sewage to the upper end of the zig-zag filter, and the inlet sewer I provide with sluices or valves so that the sewage may either be directed through the zig-zag filter or may in case of need be allowed to flow direct into the outlet sewer or channel. I prefer to arrange the open zig-zag channel filters in pairs, the lower ends of the channels of each filter being brought together so as to flow into the same outlet sewer, whilst the inlet sewer is provided with sluices so that it may be caused to supply sewage to the upper end of either filter or to both filters at once if desired. Upon the bottom of the open zig-zag channels deodorizing material or other material to act chemically upon the sewage may be placed, or these materials might be placed in filter frames placed across the open zig-zag channel so that the sewage must flow through it, or deodorizing or other material may be sifted or thrown into the sewage as it is flowing down the channel, or the materials may be mixed with the sewage before the sewage is allowed to flow down the filter.

The filter frames are so constructed as to be readily lifted up from the open channels and be emptied and refilled. The straw with the solid parts of the sewage arrested in it is placed into bins, together with a small quantity of dry earth or material to absorb any smells that may arise, and may afterward when the mass has settled down be carted away and used as manure.

The frames for holding the straw or filtering material I prefer to form of network attached to two bars, one fixed across the top and the other across the bottom of the channel.

The water as it flows through the filter may be caused to drive a water wheel to work any machinery employed in connection with the filtering apparatus.

*Leopard's Improvements in Treating and Filtering Sewage.*

**SPECIFICATION** in pursuance of the conditions of the Letters Patent filed by the said John Leopard in the Great Seal Patent Office on the 20th August 1870.

**TO ALL TO WHOM THESE PRESENTS SHALL COME**, I, JOHN LEOPARD, of Hassocks Station, Hurstpierpoint, in the County of Sussex, send greeting.

**WHEREAS** Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-first day of February, in the year of our Lord One thousand eight hundred and seventy, in the thirty-third year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said John Leopard, Her special licence, that I, the said John Leopard, my executors, administrators, and assigns, or such others as I, the said John Leopard, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN TREATING AND FILTERING SEWAGE, AND IN APPARATUS TO BE EMPLOYED FOR THESE PURPOSES," upon the condition (amongst others) that I, the said John Leopard, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

**NOW KNOW YE**, that I, the said John Leopard, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say :—

This Invention has for its object improvements in treating and filtering sewage, and in apparatus to be employed for these purposes.

For the purpose of filtering sewage I cause it to flow down a channel having a slight fall or inclination. Across the channel at intervals are placed frames containing straw, or it might be rushes or heath, sea-weed, or such like substances. As the sewage flows through these filters the solid matters and organic or other impurities contained in

it are arrested in the straw or like material, while the clear liquid flows away from the lower end of the channel into an outlet, sewer, or passage. The filter frames are so constructed as to be readily lifted up from the open channels to be emptied and refilled. I prefer to form them of network attached to two bars, one placed across the top and the other across the bottom of the channel. The straw or other filtering material with the solid parts of the sewage arrested in it, is, when removed from the filter frames, placed into bins, together with a small quantity of material to absorb any smells that may arise and may be used as manure.

Having thus described the nature of my Invention, I will proceed to describe more fully the manner in which I prefer to carry the same into effect.

The channel along which the sewage is to flow may either be a straight channel or a zig-zag or winding channel, and it may be constructed of metal or masonry, or otherwise, and be either covered over at the top or left open as preferred. I prefer that the channel should be about four feet in depth. Across the channel are placed numerous filters of vegetable absorbent defecating material, such as straw, hay, husk, rush, flag, fern, heath, sawdust, foliage, and sea-water plants.

In the Drawing hereunto annexed I have shown the manner in which I prefer to construct the filters. Each of such filters is composed of a net marked *a* attached to two bars *b*, *b*, one of which passes across the top and the other across the bottom of the channel. The bottom bar can be raised when it is desired to remove the straw or material, and to place fresh straw or material into the net any convenient arrangement may be employed for so raising and lowering the bottom bar in the arrangement shown in the Drawing. The bottom bar is near each of its ends attached to an endless chain which passes around a pulley *c* at the bottom of the channel, and also around a pulley *d* carried by an axis *e* above the top of the channel. By turning this axis by any suitable means motion may be given to the endless chains, and the bottom bar *b* can be raised or lowered. When the bar is raised into the position shown at Figure 1 the net can be emptied and refilled, or be taken away and a fresh one substituted for it, provision being made for readily attaching and detaching the bar *b* to and from the endless chains. When the parts are in the position shown at Figure 1, and fresh straw or material has been placed into the net, the grating *f* is turned down to

enclose the straw or material, and the bar is lowered to the bottom of the channel into the position shown at Figure 2, so that the filter lies across the channel, and the stream of sewage passing down the channel has to filter through it. In place of the straw or filtering material being held in a net in the manner above described it may be otherwise held in place across a channel for sewage to filter through it; as, for example, it may be packed in between two vertical gratings placed across the channel, or the gratings might be circular, and the sewage be supplied to the central space, and be allowed to filter out through the gratings, deodorizing material, such as sawdust, may be thrown on to the sewage as it is flowing down the channel.

As before stated the straw or filtering material with the solid parts and impurities of the sewage arrested in it is when removed from the filter frames placed into bins, together with a small quantity of sawdust or other material to absorb any smell that may arise, and such materials may be used as manure.

Having thus described the nature of my Invention, and the manner of performing the same, I would have it understood that what I claim is,—

First. The filtering or treating sewage to separate the solid from the liquid part by causing it as it flows along a channel to pass through filters composed of straw, rushes, sea weed, or such like material.

Second. The arrangement of apparatus substantially as herein described and shown by the Drawings for treating or filtering sewage.

In witness whereof, I, the said John Leopard, have hereunto set my hand and seal, this Twentieth day of August, in the year of our Lord One thousand eight hundred and seventy.

JOHN LEOPARD. (L.S.)

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FIG. 2.

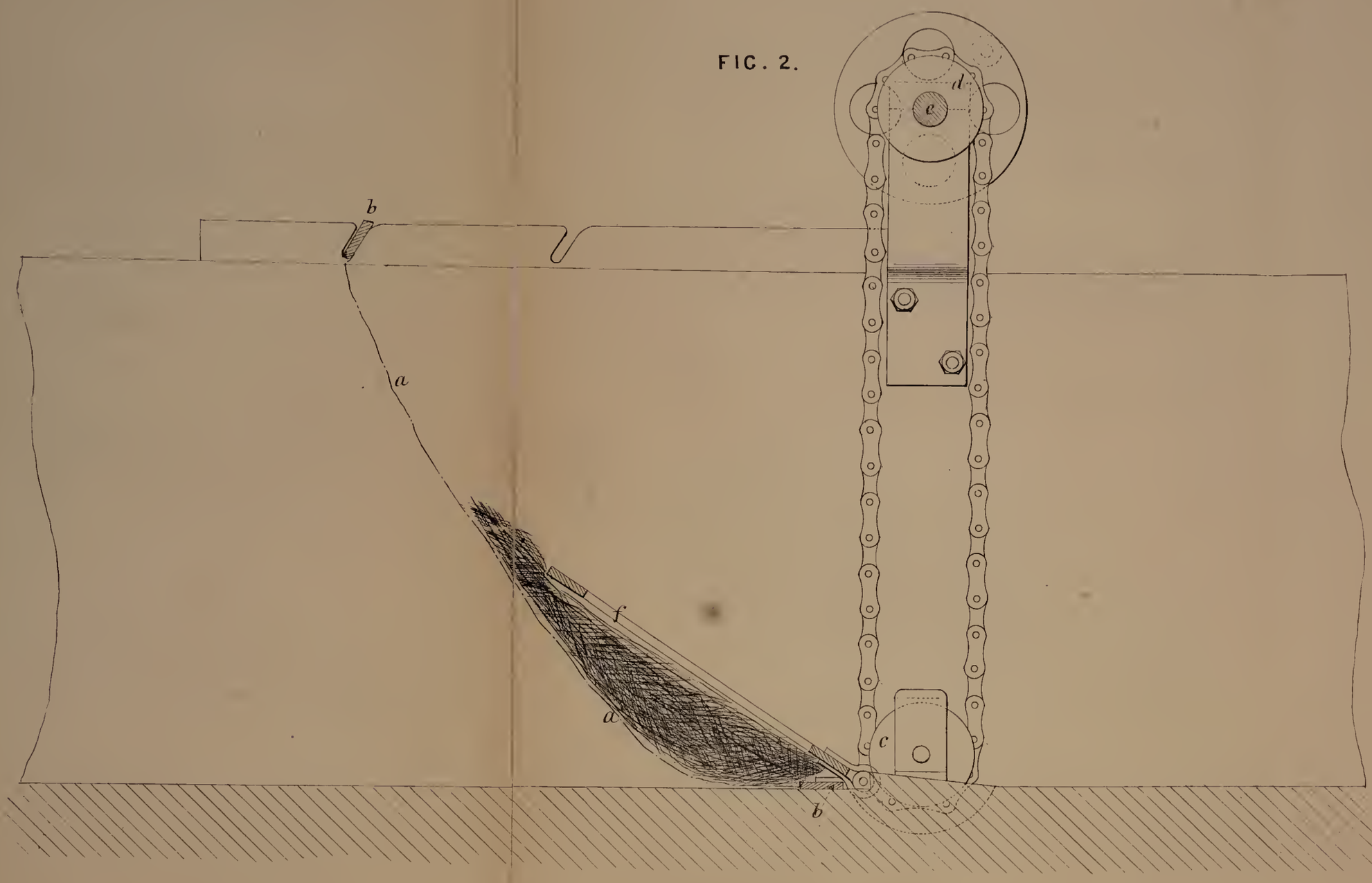


FIG. 1.




*The filed drawing is partly colored.*

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